Understanding Anisotropic Highlights for Interactive Appearance Editing

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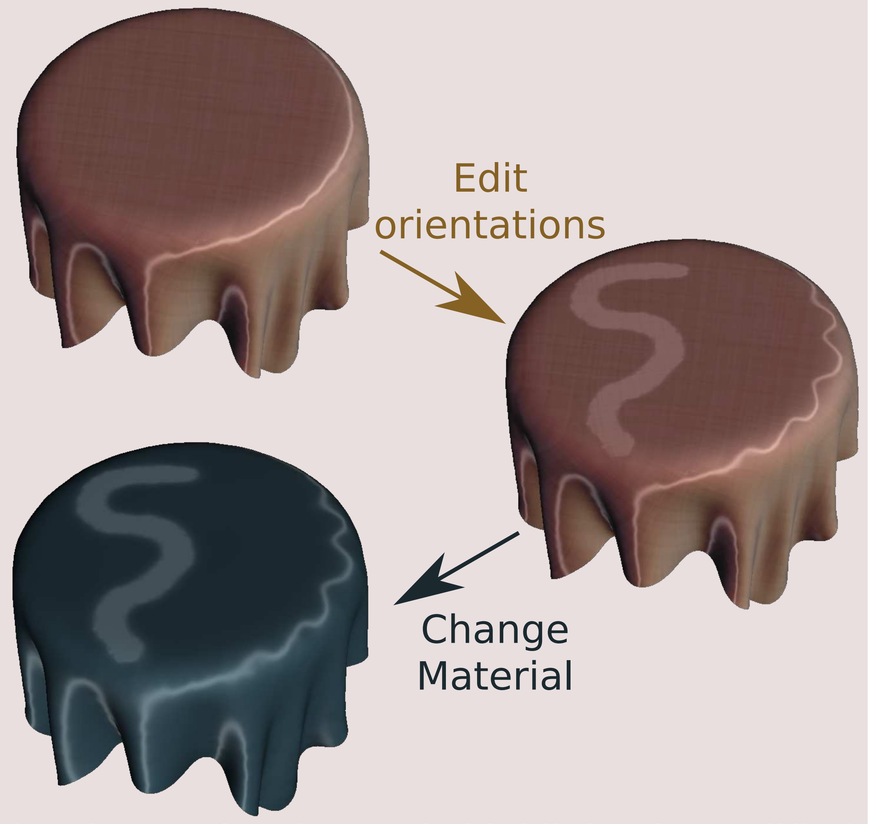
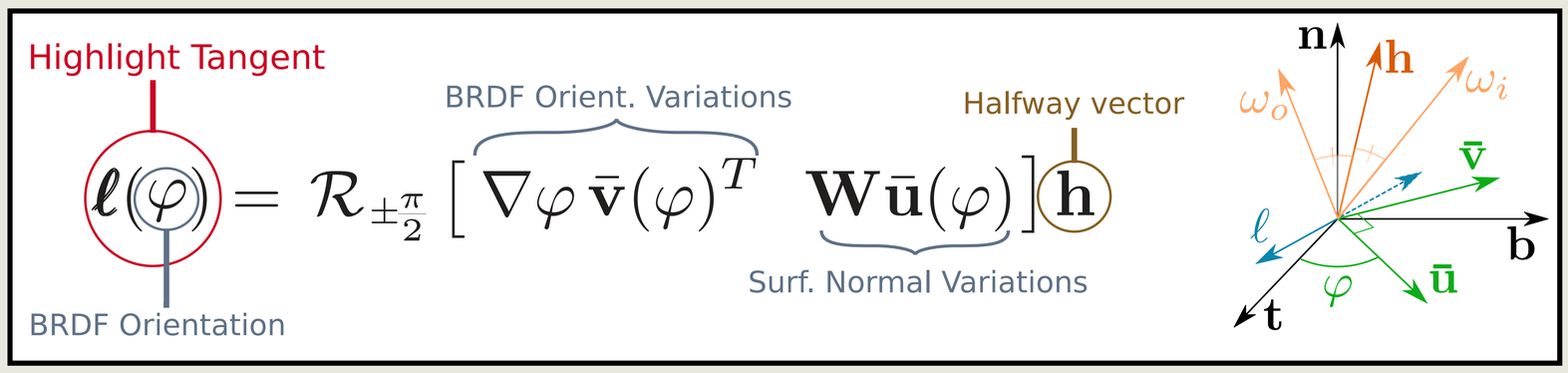
Goals

- Understand the shape of **anisotropic highlights** on arbitrary objects
- Infer local **BRDF orientations** from user-specified highlight shapes



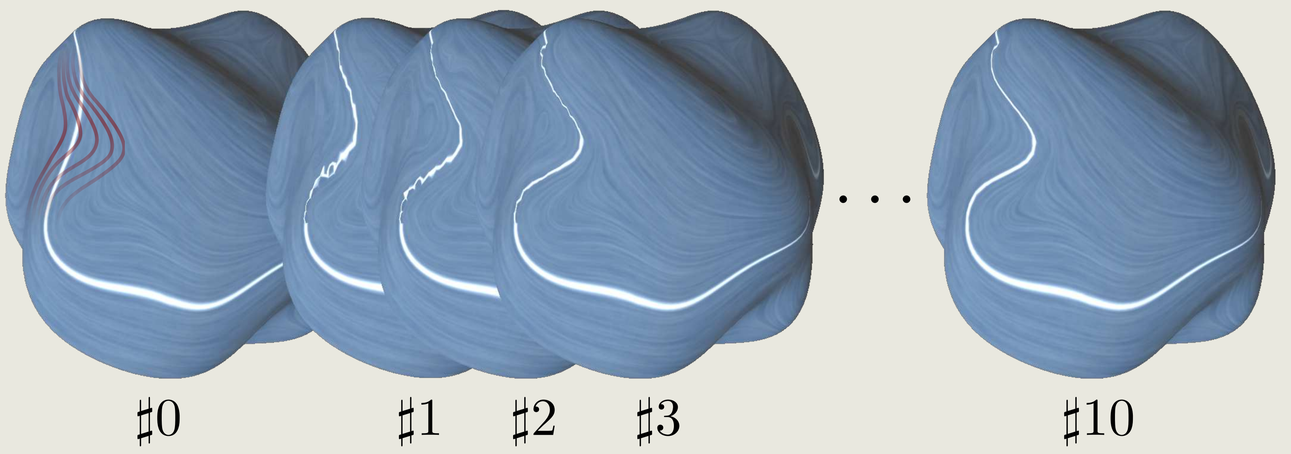
The shape of anisotropic highlights is modified independently of the type of material.

The shape of anisotropic highlights



Highlight tangent field depends on variations...
... of *BRDF orientations* (geodesic curvature & splay)
... of *surface normals* (directional curvature & torsion)

Our non-linear solver optimizes BRDF orientations φ
to yield the desired highlight tangent field ℓ

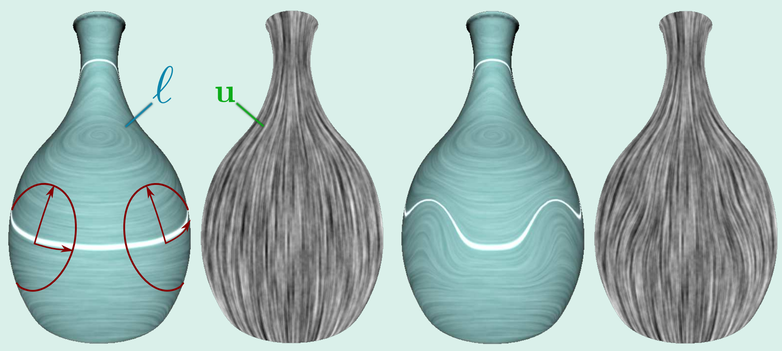


Highlights deformed into their desired shape (red curves) in a few iterations.

Highlight manipulation tools

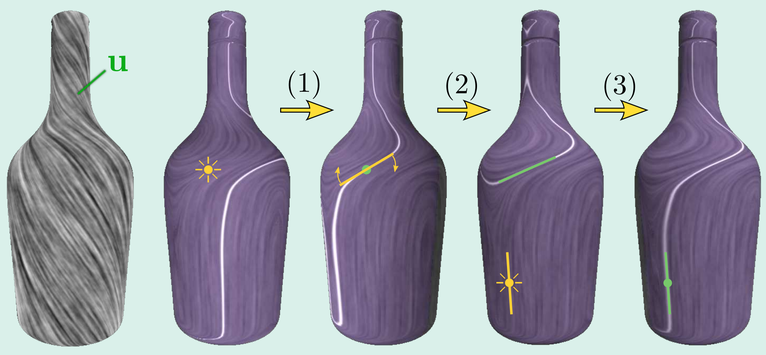
Warp tool

Deform the highlight tangent field to deviate trajectories of highlight curves



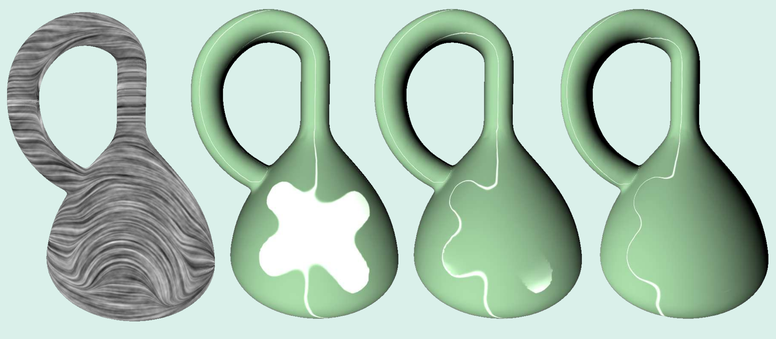
Light tool

Retrieve a light source given a point/tangent constraint for the highlight curve

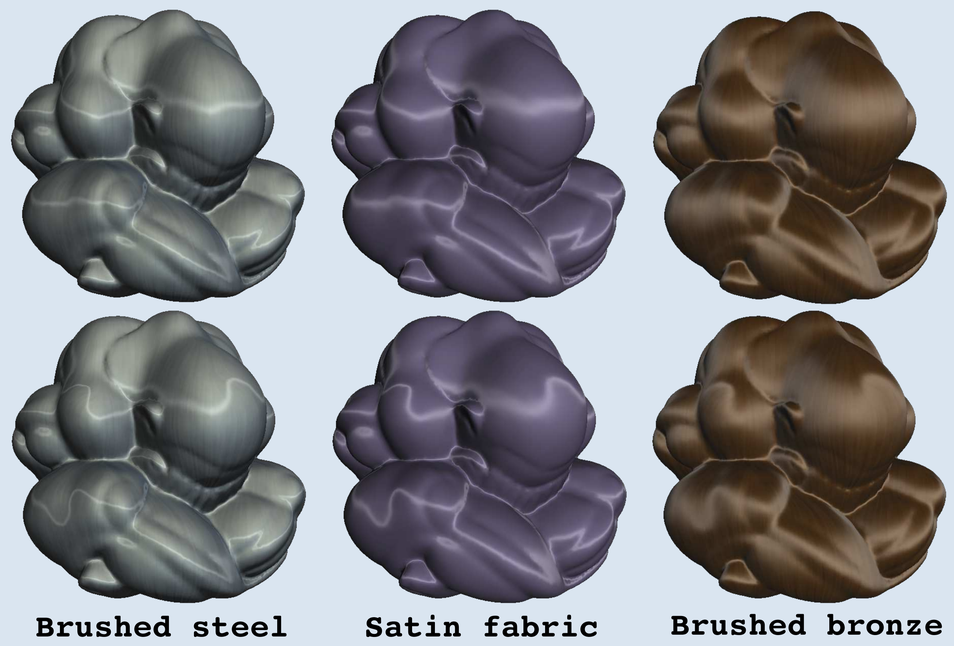


Stencil tool

Paint a degenerate highlight region that quickly vanishes when lighting is rotated



Additional results



Top/bottom row: initial/edited highlights.
Manipulations are preserved across material changes.

Manipulated highlights are preserved even in complex scenes rendered with global illumination.

Conclusions

- Provide **explicit relations** between highlights, lighting and surface properties.
- Future work: investigate **relevance** of highlight tangent formula to Human Vision.